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# WIND SPEED VARIABILITY OVER THE MARMARA SEA

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**Abstract**
Between 2000 and 2006, wind speed measurements were collected over the Marmara Sea by the SeaWinds scatterometer on the QuikSCAT satellite, at a spatial resolution of 0.25 x 0.25 degree. Relatively small inter-annual variability was noted in the monthly mean wind speeds. Typically, wind speed during summer was weaker (by approximately 2 m/s) than that observed in winter. This remotely-sensed wind data set is intended for various air-sea interaction studies and modeling efforts in the region.
*Keywords : Marmara sea, Wind/font, Remote Sensing, Models.*

1. Introduction
The Marmara Sea is an inland sea, connected to the Black Sea and the Aegean Sea through the Bosphorus and the Dardanelles straits, respectively. It therefore represents the only linkage between the two basins. Although the Maramara Sea is greatly influenced by various oceanographic features (e.g., ocean currents, temperature, and salinity) of the Black Sea and the Mediterranean Sea via the Aegean Sea, detailed information on local physical and dynamical processes is sparse. This is mainly due to the lack of fine resolution ocean models and near-surface atmospheric forcing products over the Marmara Sea.

Given the reasons mentioned above, in the Marmara Sea there is an urging need for fine spatial resolution oceanographic data. Thus, we will present herein the inter-annual variability of wind speed, which is one of the key atmospheric variables driving ocean circulation. This will be accomplished by using satellite-based wind measurements, which are gridded at a resolution of 0.25 x 0.25 degree over the region.

2. Changes in Monthly Wind Speed
The measurements of wind speed and direction over the ocean surface were obtained from the SeaWinds scatterometer on the QuikSCAT satellite. The SeaWinds scatterometer is an active microwave sensor, providing an average of two observations per day. A scatterometer measures the strength of signals returned from each location at several angles. These backscatters are then used to determine the wind direction and speed, calibrated to the neutral stability at a height of 10 m above the sea surface [1].The gaps in the coverage are filled by using a variational method.

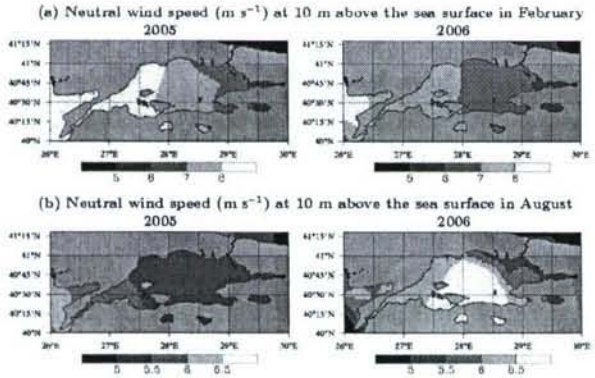


Fig. 1. Equivalent neutral wind speeds processed from the 0.25 x 0.25 degree resolution QuikSCAT measurements.

As evident from Figure 1, the 10 m wind speed does not change significantly for a given month, i.e., could be considered uniform over the Marmara Sea. However, it can change from one year to another (e.g., 2005 to 2006) for a given month and is especially evident in August. Winds are relatively strong from November through February during 2000-2006 (Fig. 2). Overall, the variability in wind speed is small. This is partly due to the fact that a resolution of 0.25 degree is still not sufficient to exhaustively describe wind trends over the small Marmara Sea.

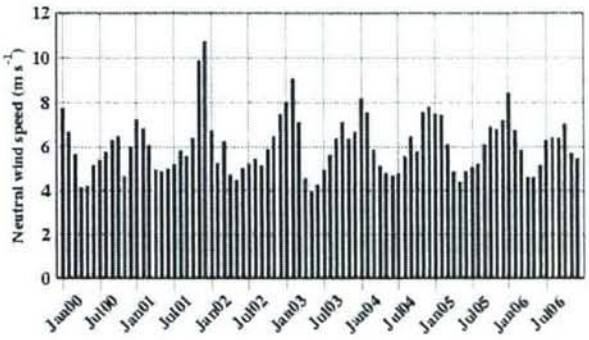


Fig. 2. Areal averages of monthly mean neutral wind speeds at 10 m above the sea surface over the Marmara Sea from 2000 through 2006.

3. Conclusions
Wind data from QuikSCAT are not very accurate near coastal regions involving the Bosphorus and Dardanelles Straits, as the satellite footprint may include land areas near the coast. To overcome this problem, there is a need for new technology (available, but not currently in place, as of this writing). QuikSCAT is characterized by unique, specific biases which are partially due to sampling artifacts.

Acknowledgments
This publication has been approved for public release.

**Reference**
Bourassa M.A., Legler D.M., O'Brien J.J. and Smith S.R., 2003. SeaWinds validation with research vessels. *J. Geophys. Res.*, 108, doi: 10.1029/2001JC001081